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FEATURED STORY:
AIR FORCE VISIT



SURGERY AT SEA: STUDYING THE EFFECT OF HIGH DECK ACCELERATIONS ON SURGICAL TASKS (COVER)

From Naval Medical Research Center Public Affairs



SILVER SPRING, Md. – Surgery can be a daunting thought, regardless if you are under the knife or holding it. With many moving parts, surgery can be complicated. Put the operating room on a ship at sea during high sea states, and it gets even more challenging.

Researchers from the Naval Surface Warfare Center Panama City Division and the Naval Postgraduate School spent the voyage conducting experiments to quantify the ability of U.S. Navy medical personnel to perform simulated surgical procedures on life-like mannequins while aboard non-traditional Navy vessels during high

sea states. The objectives of the experiments were to investigate the effect of motion induced fatigue, motion induced interruptions, motion sickness incidence, and Sopsite syndrome on surgical procedures while in a shipboard environment....

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MILITARY MEDICINE PROVIDES WORLD-CLASS SOLUTIONS FOR COMBAT CASUALTIES

Story Courtesy of Health.mil

BETHESDA, Md – Experts across the Military Health System are collaborating with civilian researchers on an advanced alternative to socket-based prosthetics for some amputees. Osseointegration, a process that attaches the prosthesis directly to the skeleton, can improve comfort and mobility for qualified patients with amputations.

Navy Cmdr. (Dr.) Jonathan A. Forsberg, an orthopedic oncologist at Walter Reed National Military Medical Center (WRNMMC) in Bethesda, Maryland, said he treats patients who are newly injured and those who have been living with amputations for many years.

“Developing osseointegration as a capability within the Department of Defense makes good on our commitment to provide world-class solutions for combat casualties throughout the entire spectrum of care,” said Forsberg....



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79TH MEDICAL WING COMMANDING OFFICER VISITS NAVAL MEDICAL RESEARCH CENTER (FEATURE)

From Naval Medical Research Center Public Affairs



SILVER SPRING, Md. – Air Force Colonel Sharon Bannister, commanding officer, 79th Medical Wing, was welcomed by Navy Captain Jacqueline Rychnovsky, commanding officer, Navy Medical Research Center (NMRC), March 6. Bannister, accompanied by Air Force Major Peter Carra, Executive Officer, 79th Medical Wing, discussed the capabilities of NMRC’s En Route Medical Care Program with the NMRC research team.

Bannister was given a quick briefing from Air Force Colonel Debra Malone, Co-Investigator, En Route Care Program, NMRC, before a guided tour of the facilities. The research team demonstrated several unique and one-of-a-kind capabilities at the laboratory.

Specifically, the research team demonstrated the NMRC hypobaric chamber. The tour led by Dr. Richard McCarron, Department Head of Neurotrauma, NMRC, and Dr. Anke Scultetus, Principle Investigator on the project, simulated patient transport under hypobaric conditions for hours at a time.

Recent advances in battlefield medicine allows wounded warfighters better chances of survival. However, such advancements have also highlighted the need for a better understanding of the conditions for the transport of wounded service members from the battlefield.

The Neurotrauma Department at NMRC has initiated a series of studies investigating pre-clinical models of militarily-relevant disorders including traumatic brain injury (TBI), polytrauma, orthopedic injury, lung injury, hemorrhage, and infection. The department has recently developed the unique capability of studying the effects of simulated flight on physiological and anatomical outcomes in instrumented laboratory models.

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R&D CHRONICLES: THE MOSQUITO FIGHTERS, PART XII: THE QUEST FOR MEDICINE'S HOLY GRAIL

By André B. Sobocinski, Historian, BUMED

“IF WE CAN DEVELOP A MALARIA VACCINE IT WILL HELP PREVENT AT LEAST 200 MILLION CASES A YEAR, AND SAVE THE LIVES OF TWO CHILDREN EVERY MINUTE.”

~CAPTAIN JUDITH EPSTEIN, MC, USN, CLINICAL DIRECTOR, MALARIA PROGRAM



With the success of recent Navy and Army-lead clinical trials of Sanaria's PfSpz (*Plasmodium falciparum* sporozoite) vaccine, medical science is on the cusp of a historic breakthrough and one that could forever shift the global health dynamic. This is a story many decades in the making and one that has crossed through the very epicenters of Naval Medical Research Center (NMRC) and its forbearer, the Naval Medical Research Institute (NMRI).

Dr. Levon Terzian may not be a recognizable name today, but from the 1940s until his retirement in 1970 he was the face of NMRI's malaria program. A former Johns Hopkins experimental biologist, Terzian would serve with Navy malaria control teams deployed to the Pacific in World War II and later join NMRI as a scientist.

In the late 1940s, Terzian began exploring the relationship between antimicrobial agents/antibiotics and the susceptibility to malaria. He found evidence that sulfa drugs—then commonly used when antibiotics were unavailable—could lead to a cellular breakdown in mosquitoes making them more susceptible to an “invasion”

of malaria parasites. In the 1950s and 1960s, Terzian would be among the first to experiment with radiation to assess individual immunity against malaria and use gamma rays to induce sterility in disease-carrying mosquitoes.

As Terzian's career was winding down in the late 1960s, NMRI's malaria program could be called robust. Fueled in part by the Vietnam War, NMRI conducted extensive investigations on prophylactic and curative effects of new anti-malarials, and continued research on gamma radiation resistance in mosquitoes/mosquito-borne parasites. And in 1967, NMRI's Division of Protozoology perfected new methods for growing large numbers of the fixed tissue stages of malaria parasites enabling greater understanding of disease transmission.

By the early 1970s, in what can be considered foundational for the future malaria research, NMRI scientists began studying the ability of irradiated sporozoites to elicit protective immunity against malaria and developed improved methods for “obtaining, separating and purifying sporozoite preparations.”

Over the next decades, the focus of the NMRI malaria program would shift towards genomics and developing an effective vaccine against malaria. Perhaps no one was more associated with this effort than Capt. (ret.) Stephen Hoffman, Medical Corps, USN. From 1995 to 2005, Hoffman's was the most cited author for scientific papers on malaria. As Director of the NMRI/NMRC malaria program from 1987-2000, Hoffman and his team would sequence the *P. falciparum* genome, lead the first studies that showed that DNA vaccines elicited killer T cell responses in humans and conceive of a whole-parasite (sporozoite) vaccine....

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NAVY MSC SELECTS NAVY MEDICINE'S AEROSPACE EXPERIMENTAL PSYCHOLOGY OFFICER OF THE YEAR 2016

Story Courtesy Navy Medical Service Corps



SILVER SPRING, Md – Lieutenant Commander Peter Walker was selected as Navy Medicine's Aerospace Experimental Psychology Officer of the Year for 2016 as a testament to his outstanding research expertise, strong organizational skills, and impressive leadership and mentoring ability.

Walker serves as the Deputy Director for Operational Undersea Medicine (OUMD) at the Naval Medical Research Center in Silver Spring, Maryland. As Deputy Director for OUMD, Walker was instrumental in leading a talented and diverse group of 75+ uniformed, GS, and contract employees and was responsible for managing an execution of over \$20 million impacting Navy Medicine research and development.

He has been a leading force in prioritizing the Navy Surgeon General's strategic goals of Readiness, Health, and Partnerships within Navy Medicine Research and Development....

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NAVY MSC SELECTS NMRC OWN AS NAVY MEDICINE'S PHYSIOLOGY OFFICER OF THE YEAR 2016

Story Courtesy Navy Medical Service Corps



SILVER SPRING, Md. – Lieutenant Joshua Swift was selected as Navy Medicine's Physiology Officer of the Year for 2016 as a testament to his outstanding research expertise, strong organizational skills, and impressive leadership and mentoring ability.

Swift serves as Deputy Department Head, Undersea Medicine, Naval Medical Research Center, Silver Spring, Maryland. He distinguished himself in the specialty and MSC community with strong, positive leadership as a mentor of multiple junior officers at the command and as an active member across our community including his recent selection as a member of the Medical Service Corps e-Mentoring Strategic Goal Group.

Swift demonstrated solid command contributions through local leadership roles, numerous collateral duties, and documented success as a Department of the Navy (DoN) researcher. He expeditiously expanded research at his command with far-reaching operational impact, including ground and aviation hypoxia....

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NMRC DEPUTY DIRECTOR FOR INFECTIOUS DISEASE PRESENTS AT ALMA MATER

From Naval Medical Research Center Public Affairs



SILVER SPRING, Md. – Cmdr. Michael Stockelman, Deputy Director for Infectious Diseases, Naval Medical Research Center (NMRC), presented a seminar to the Cancer Biology Program at his Alma Mater, University of Cincinnati (UC), March 12, entitled “Medical Research in the U.S. Navy with an Emphasis on Infectious Disease” to a room full of his former mentors and teachers, as well as scientists and industry professionals.

Stockelman graduated from the Anatomy and Cell Biology Department at UC with a PhD in 1996. After reconnecting with Dr. Bob Cardell, former chairman of Anatomy and Cell Biology at UC, Stockelman was asked to present in their seminar series. Cardell, now emeritus, is still very involved with the graduate student

program; “he really wanted the current students to hear about my career path and the options that are available working with the Navy in medical research,” said Stockelman....

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PHYSICAL ACTIVITY MAY DIMINISH RISK OF MOOD DISORDERS IN GENETICALLY PREDISPOSED INDIVIDUALS

From Naval Health Research Center Public Affairs



SAN DIEGO – Recent research from Naval Health Research Center’s (NHRC) Warfighter Performance Department found that physical activity may diminish the risk of major depressive disorder (MDD) and suicidal ideation (SI) in individuals with a genetic predisposition. Study findings were published online in the January issue of Psychiatry Research.

The NHRC study, “A genetic risk factor for major depression and suicidal ideation is mitigated by physical activity,” cited past research that identified MDD as the most common psychiatric disorder and SI as the strongest risk factor for attempted and completed suicide. Despite this, NHRC researchers stated little is known about their causes, particularly in vulnerable populations, such as service members who are exposed to chronic stress and combat....

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NAMRU-SA RESEARCHERS DEVELOPING FIELD PORTABLE STERILIZER

By. David DeKunder, 502nd Air Base Wing Public Affairs, San Antonio



SAN ANTONIO – Researchers at the Naval Medical Research Unit San Antonio (NAMRU-SA) are developing a portable sterilizer for use in military field operations.

“The prototype ozone sterilizer would enable military medical personnel to sterilize medical and dental instruments in areas that do not have infrastructure to support electrical power, and is less heavy to transport,” said Roy Dory, head of the Biomedical Systems, Engineering and Evaluation Department, Combat Casualty Care Directorate, NAMRU-SA.

“The goal of the project is to develop a truly self-sufficient, portable sterilizer that can be operational from battery power,” said Dory....

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NAMRU-3 VECTOR BIOLOGY TEAMS UP WITH NIGERIAN FEDERAL MINISTRY OF HEALTH CENTER COLLEAGUES

From Naval Medical Research Unit No. 3 Cairo Public Affairs



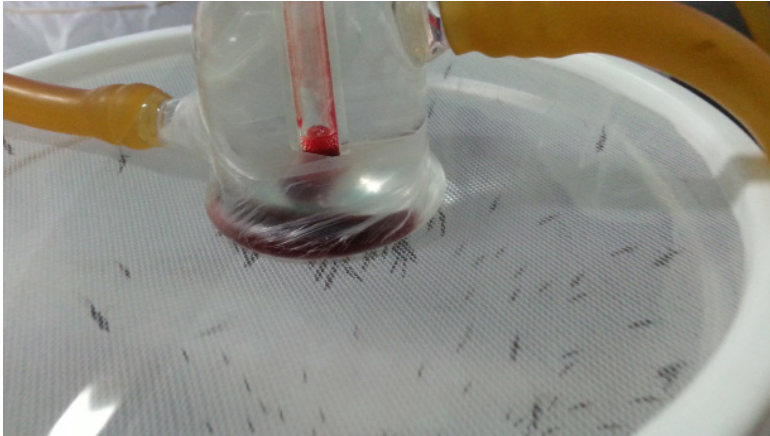
ABUJA, Nigeria – Four U.S. Naval Medical Research Unit No. 3 (NAMRU-3) vector biologists and other staff members traveled to Abuja and Enugu State, Nigeria, in February to expand on collaborative research efforts in the region, as well as to survey for arboviruses transmission. They were joined by researchers at the National Arbovirus and Vectors Research Center (NAVRC), as well as soldiers from the 82 Division, Nigerian Army, who will be included in an arbovirus risk mapping project.

The 17 NAVRC researchers were divided into two groups; molecular biology and entomology. The molecular group, taught by Nermeen Fahmy, Medical Research Technologist, NAMRU-3, focused on viral ribonucleic acid (RNA) and deoxyribonucleic acid (DNA) extraction, polymerase chain reaction (PCR), gel preparation, loading samples, running electrophoresis, data analysis, detection for dengue and chikungunya viruses serotypes in Aedes mosquitoes, as well as molecular detection of *Plasmodium falciparum* in Anopheles gambiae mosquitoes....

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TURNING THE TABLES ON MOSQUITOS – NAMRU-6 RESEARCHERS INFECT MOSQUITOS WITH MALARIA

From U.S. Naval Medical Research Unit No. 6 - Peru Public Affairs



LIMA – The Entomology Department at the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) in Lima, Peru, developed a highly productive, self-mating, sustainable breeding colony of *Anopheles darling* mosquitos at the laboratory's insectary. In collaboration with the NAMRU-6 Parasitology Department, researchers turned the tables on the mosquitos, and use blood-meals to infect mosquitos with malaria.

Researchers take blood from patients infected with the malaria parasite, *Plasmodium vivax*, and feed it to uninfected female *Anopheles darling* mosquitos. In a

controlled laboratory setting, the malaria infected blood is fed to the mosquitos through a membrane feeding system.

P.vivax, unlike other malarial parasites, cannot be grown in a culture; so blood from malaria patients has to be used in this feeding system. Additionally, the *P. vivax* parasites will only reproduce inside mosquitos, and this female mosquito feeding system is the only way to produce large amounts of a particular developmental stage of the disease, known as sporozoites. Developing large amounts of *P. vivax* sporozoites is critical for vaccine development and anti-malaria drug testing.

“Minding the logistical constraints, our team was able to establish a new system for *P. vivax* sporozoite production in the Peruvian Amazon, a unique, valuable Navy resource for vivax malaria research,” said Dr. Gissella Vasquez, researcher, NAMRU-6.

NAMRU-6 Entomology has gradually optimized the system and increased the average per-mosquito yield from approximately 1,000 to over 15,000 sporozoites. In 2016, this system produced 50 million *P. vivax* sporozoites using 27,000 mosquitos to support vivax malaria vaccine studies. Steady mosquito availability and year-round access to *P. vivax* blood-donors in the same location, makes the NAMRU-6 *P. vivax* sporozoite production system a valuable resource for basic and applied research in support of the Department of Defense Malaria Vaccine initiative.

“Establishment of this new *P. vivax* sporozoite system is a remarkable achievement based on tireless dedication, exceptional teamwork, and passionate commitment from amazing group of people,” said Vasquez.

Malaria, a mosquito-borne parasitic disease, if left untreated can lead to severe illness and sometimes death. According to the latest World Health Organization (WHO) estimates, there were 212 million cases of malaria in 2015 and 429,000 deaths....

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